Expert Choice™ Getting Started

After downloading and installing the Expert Choice™ software, you should do the following:

1. Click on File.
2. Click on Open.
3. Under Folders, locate the directory where Expert Choice™ is installed. This file may be located in the folder C:\program files\technologydb\.
4. Either type **voc1.ec1** under the File name prompt and click the OK button, or scroll down through the file names until **voc1.ecd1** is located.
5. Double click on the filename **voc1.ec1.** This will launch the predefined VOC database file.

The next topic, Expert Choice™ Help, includes instructions to navigate through the Expert Choice™ software.

Expert Choice Ô Help

Upon entering Expert Choice™ , the user will see the tree-diagram for the off-gas database. The seven criteria are listed in the first row. The criteria are:

- CONTAM(Range of Contaminant Removed)
- COST(Unit Cost ($/lb.) Contaminant Removed)
- DRE(Destruction Removal Efficiency (%))
- REG COMP(Regulatory Compliance/Acceptance)
- CAPACITY(Flow Rate Threshold (CFM))
- CAPITAL(Level of Capital Investment Required)
- O&M(Level of O&M Investment Required)

The seven off-gas Technologies for each criteria are:

- ADSORB(Vapor Phase Adsorption)
- ALKALI(Alkali Bed Reactor)
- CATALYT(Catalytic Thermal Oxidation)
- UV DEST (Ultraviolet Oxidation)
- PLASMA(Plasma Destruction)
- THERMAL (Thermal Oxidation)
- FLAMELESS(Flameless Thermal Oxidation)

Each of the criteria are initialized to be of equal importance. The importance of each criterion will change as the pairwise assessment is changed. The current example is based on a Navy site. By clicking on one of the criterion, say "Cost" and then clicking on the Assessment drop-down menu at the top of the screen and then clicking on Pairwise, the user can see how the technologies are weighted against each other for each of the criteria.

Continuing with this example, the Matrix tab should be highlighted blue. Notice in the middle of the screen that the Adsorption technology is three times as important (or preferable) to the Alkali technology with respect to cost. The arrow is pointing to the left, which indicates that Adsorption is preferable to Alkali. To make the arrow point upward to the Alkali technology, click on the Invert button at the bottom left part of the screen. Notice at the top of the page that the order of importance is inverted and that Alkali is now 3 times more important than Adsorption with respect

to cost as the goal. Click invert again to reset the order of importance back to Adsorption. Next, click on the Calculate button at the bottom left. Notice on the next screen that the inconsistency ratio is 0.03 < 0.1, so our numerical rating comparing the technologies against each other for cost is within a suitable range. Had the inconsistency ratio been greater than 0.1, it would have been necessary to return to the matrix and revise the numerical ratings in the matrix until the inconsistency ratio dropped below 0.1. To move to the next criteria, click the Record push button. To return to the matrix, (not necessary in this example, since the inconsistency ratio was less than 0.1) click the Abandon push button, then click on the Assessment pop down menu and select Pairwise. Once all changes are made, click on the 6th Icon (Line Graph) button in order to make "What If" evaluations.

Once the line graph icon has been clicked, notice the icons along the top of the screen. These icons allow the user to select various comparison charts. The most useful chart is the sixth icon from the left-hand side, depicted by a horizontal bar chart. Once the user has entered the charts, any changes made to the charts will not affect any of the data entered prior to entering the charts, either at the matrix level or the opening screen level. This part of Expert Choice is the graphic evaluation portion where the user can vary the importance of criteria to see the effect on the technologies. Also note that each of the five charts are linked, so that changes on one chart will be reflected in the other charts. In order to reset to the defaults, click on the third icon that looks like a circular line with an arrow at the end. The five charts in order from left to right are:

- Chart 1Performance (1st Icon)
- Chart 2Dynamic (2nd Icon) This is the most useful chart for comparing

  technologies
- Chart 3Gradient (3rd Icon)
- Chart 42-D Plot (4th Icon)
- Chart 5Differences (5th Icon)
- Chart 6Summary Chart listing all views at once

Chart 1

Performance –

This chart shows the best overall choice on the right. The first time in Adsorb should be the preferred off-gas technology since it's displayed on the top of the others on the right-hand side. As the individual bars are pulled up, for instance clicking on the Capital bar and pulling to the 40% mark makes the Thermal Technology a better choice overall. This chart is less useful than Chart 2. Now click on the third icon at the top to reset the defaults before moving on to Chart 2.

Chart 2

Dynamic –

Click the "Cost" bar on the left and pull it up to around 50%. Notice that the Adsorption technology really stands out as the best solution. The user should click on different criteria bars on the left-hand side and drag toward the right to see which technology becomes the preferred selection. When completed with this task, click on the third icon at the top to reset the defaults before moving on to Chart 3.

Chart 3

Gradient –

The solid vertical line is the default percentage for "Cost". The X-axis shows "Cost". Now click on the X axis drop-down menu at the top of the screen. Click on "Capacity" to change the X axis at the bottom. Now click on the solid vertical line and drag it over to the 50% mark. Notice that the best technology when the capacity is rated higher than originally selected should be nearer the top of the page. In this case Adsorption is still the best, but UV destruction is better than Alkali; whereas, at the default line, Alkali was rated better than UV Destruction based on where the lines for each individual technology cross the red vertical default line. Now click on the third icon at the top to reset the defaults before moving on to Chart 4.

Chart 4

2-D Plot –

Here the user can compare each technology against two criteria as opposed to all seven. The user can change the two criteria compared by clicking on the X Axis and Y Axis drop-down menus at the top of the screen. Let's change and compare capital cost on the Y axis and O&M on the X axis. Colored circles in the upper right quadrant are preferable to circles on the lower left quadrant. In this comparison, Adsorption, Alkali, UV destruction, and Catalytic Oxidation all have similar capital costs (Y-axis), but Adsorption has a lower O&M cost (X axis). Low cost is associated with a higher percentage (desirability); whereas, a high cost is associated with a lower percentage (desirability). Now click on the third icon at the top to reset the defaults before moving on to Chart 5.

Chart 5

Differences –

This chart can be used to compare one technology to another. Go to the drop-down menu at the top of the screen and click on "Differences From." Then click on Flameless. Now Flameless can be compared to the other six technologies versus the seven criteria and overall. Notice that Flameless is better than Adsorption for Contaminant, DRE, and Regulatory Compliance, but Adsorption is better for Cost, Capital Outlay, and O&M outlay. Overall, based on these 7 criteria, Adsorption is the better choice. Now click on the third icon at the top to reset the defaults before moving on to Chart 6.

Chart 6

Summary of all charts –

Chart 6 is just the summary view of Charts 1-5.

To return to the main screen click on the X in the upper right hand corner of the screen, then double click on Goal at the main screen.

The MS Access database will launch the VOC1.EC1 file within Expert Choice when it is loaded. For additional help click on the Help drop-down box or run the Expert Choice Tutorial that comes with the current version.